UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

July 23, 2004

MEMORANDUM FOR: File

FROM: D. Robert Lohn, Regional Administrator

SUBJECT: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Proposed Qualification of the Regional Road Maintenance Program Submitted by the City of Portland, Oregon, for Nine Threatened Salmonid ESUs, Pursuant to Limit No. 10(i) of the NMFS 4(d) Rule (F/NWR/2002/01935)

Attached is a document containing a biological opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposed qualification of the Routine Road Maintenance Program submitted by the City of Portland, Oregon to nine threatened salmonid ESUs, pursuant to Limit No. 10(i) of the NMFS 4(d) Rule. In this Opinion, NOAA Fisheries concludes that the proposed approval of the program is not likely to jeopardize the continued existence of ESA-listed species.

This document contains a consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600). NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for two species of Pacific salmon and one species of groundfish. As required by section 305(b)(4)(A) of the MSA, included are conservation recommendations that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action. As described in the enclosed consultation, 305(b)(4)(B) of the MSA requires that a Federal action agency must provide a detailed response in writing within 30 days of receiving an EFH conservation recommendation.

The point of contact for this consultation is Nancy Munn of my staff in the Oregon State Habitat Office at (503) 231-6269 or nancy.munn@noaa.gov.

Endangered Species Act - Section 7 Consultation
Biological Opinion

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Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Proposed NOAA Fisheries Approval of the Regional Road Maintenance Program
Submitted by the City of Portland, Pursuant to Limit No. 10(i) of the July 2000, NMFS 4(d) Rule

Agency:	National Marine Fisheries Service
Consultation Conducted By:	National Marine Fisheries Service, Northwest Region
Date Issued:	July 23, 2004
Issued by:	Russell M Strach for D. Robert Lohn Regional Administrator
Refer to:	**2003/01644**

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1. INTRODUCTION

1.1 Background and Consultation History

NOAA's National Marine Fisheries Service (NOAA Fisheries) published an Endangered Species Act (ESA) section 4(d) rule adopting regulations necessary and advisable to conserve listed species on July 10, 2000 (65 FR 42422). The 4(d) rule creates a mechanism by which application of ESA section 9(a)(1) take prohibitions may be limited for land and water activities that NOAA Fisheries has found will contribute to the conservation of listed salmonids' habitat, yet may incidentally take[1] listed salmonids. The 4(d) rule includes thirteen enumerated limits upon the extent of the general take prohibition for 14 threatened evolutionarily significant units (ESUs). Limit No. 10 covers routine road maintenance activities. For a state, city, county, or port program to qualify under Limit No.10(i), it must adopt a routine road maintenance program (RRMP) that is substantially similar to the Oregon Department of Transportation's RRMP and is determined to meet or exceed the protections provided by the Oregon Department of Transportation (ODOT) RRMP.

On March 21, 2003, the City of Portland, Oregon, submitted their Routine Road Maintenance Program (RRMP) for qualification under Limit No. 10(i). On May 5, 2003, a Federal Register Notice was published (May 5, 2003, 68 FR 23696) announcing the availability of the RRMP for public comment. The public comment period closed on June 4, 2003. No comments were received that required a response. Following the public review period, NOAA Fisheries prepared an Environmental Assessment for compliance with the National Environmental Policy Act (NEPA). In this case, the proposed approval of the City of Portland RRMP under Limit No. 10(i) constitutes a major Federal action, thus requiring a section 7 ESA consultation. NOAA Fisheries initiated ESA section 7 consultation with itself on April 19, 2003.

The objective of this biological opinion (Opinion) is to determine whether NOAA Fisheries' proposed approval of the City of Portland RRMP is likely to jeopardize the continued existence of the ESA-listed species. The RRMP has the potential to affect nine ESUs of threatened salmonids: Seven of the 14 ESUs addressed in the 4(d) rule, and two additional ESUs (Snake River (SR) Fall-run and SR spring/summer-run Chinook salmon), not addressed in the 4(d) rule. The nine ESUs include: Lower Columbia River (LCR) and Upper Willamette River (UWR) Chinook salmon (*Oncorhynchus tshawytscha*), Snake River (SR) fall-run Chinook salmon, SR spring/summer run Chinook salmon, and LCR and UWR steelhead (*O. mykiss*), middle Columbia River (MCR) steelhead, SR steelhead, and Columbia River chum (*O. keta*). This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR Part 402.

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[1] Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct (ESA section 3(19)). Harm is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding or sheltering.

The 4(d) rule specifically excludes endangered species from it limits on the application of the ESA section 9(a)(1) take prohibitions. NOAA Fisheries, therefore, is not extending 4(d) Limit No. 10 coverage to RRMP activities within the delineated geographic boundaries of the three endangered ESUs Upper Columbia River (UCR) spring-run Chinook salmon, SR sockeye salmon (*O. nerka*), and UCR River steelhead. However, these three endangered salmonid ESUs migrate outside the geographic boundaries of their ESUs through a portion of RRMP's action area. The effects of RRMP activities (primarily conducted in tributary watershed) on endangered salmonids migrating through the middle and lower mainstem Columbia River would likely be insignificant or discountable and thus not be likely to adversely affect the UCR spring-run Chinook salmon, UCR steelhead, or SR sockeye salmon.

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for coho salmon (*O. kisutch*), Chinook salmon, and starry flounder (*Platichthys stellatus*) and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

1.2 Description of the Proposed Action

NOAA Fisheries proposes to approve the RRMP implemented by the City of Portland for all roads and bridges within their jurisdiction within city limits per Limit 10(i) of the 4(d) rule. The City of Portland developed the RRMP so that routine road maintenance activities would be protective of salmonids and their habitat. This consultation will evaluate NOAA Fisheries' proposed decision to approve implementation of the RRMP in the City of Portland under Limit 10(i) of the July 10, 2000, ESA 4(d) rule. Routine road maintenance activities are recurring activities, either scheduled or predictable, that are needed to maintain the functional integrity of the existing transportation facility.

The Bureau of Maintenance within the City's Office of Transportation (PDOT) is responsible for maintaining city streets. PDOT is charged with preserving the public investment in over $5.5 billion in transportation facilities and $1.5 billion in sewer infrastructure. Over 400 Bureau of Maintenance employees perform the inspection, cleaning, maintenance, and repairs for all the transportation and sewer-related infrastructure within the City. The infrastructure consists of streets, the sewer collection system, sidewalks, bridges, curbs, intersections, street corners, retaining walls, guardrails, stairways, traffic signals, traffic control devices, and parking meters. The Bureau of Maintenance also performs around-the-clock response to emergencies such as storms, floods, and other incidents that inhibit safe transportation.

The City covers 130 square miles with a population of approximately 545,000. Over 20% of the city is contained within Environmental Overlay zones (or E-zones). These zones provide the highest level of protection to the most important resources and functional values within the city. Maintenance of roads in these zones is carefully designed and performed in a manner sensitive to the environment and protective of the resources within the zones.

PDOT reviewed all of ODOT's RRM practices as described in the ODOT Guide. Not all of the activities performed by PDOT are included in the ODOT Guide, and therefore are not included in the proposed action. These specific activities are not eligible for approval from NOAA Fisheries at this time. Of the activities described in the ODOT Guide, PDOT determined that its street maintenance program is substantially similar to, and at least as protective as, the ODOT Guide. However, PDOT identified three program areas where the City of Portland's RRM Program differs from ODOT's Guide either in organization or in substance (Table 1).

The proposed RRM Program does not apply to the construction of new facilities or major expansion of existing facilities. It does not include development or redevelopment activities. Instead, the RRM Program encompasses road maintenance work performed on the existing right-of-way structure. Activities and some best management practices included in the RRM Program are discussed below. Many best management practices are consistent for all activities; for example, refueling must occur a minimum of 25 feet from a waterbody. No dust abatement activities are included in the proposed action.

Table 1. Comparison between the ODOT Guide and the PDOT RRM Program.

ODOT Guide Activity	PDOT Activity Identical to ODOT?
1. Surface work	No
2. Shoulder blading/rebuilding	Yes
3. Ditch shaping and cleaning	Yes
4. Sweeping/Flushing	No
5. Culvert/inlet cleaning, repair, miscellaneous hand/minor repair	Yes
6. Erosion repair	Yes
7. Channel maintenance	Yes
8. Fish restoration	Yes
9. Fish betterment	Yes
10. Bridge repair	Yes
11. Mowing, brush mowing, brush cutting (by hand)	Yes
12. Accident clean-up	Yes
13. Guardrail replacement	Yes
14. Snow/ice removal/sanding	No
15. Emergency maintenance	Yes

ODOT Guide Activity	PDOT Activity Identical to ODOT?
16. Settlements and slides	Yes
17. Extraordinary maintenance	Yes
18. Stockpiling	Yes

1. **Surface work**. This activity addresses surface and inlay repairs including all repairs of road bases, surface, and shoulder irregularities. It may involve either asphalt or concrete surfaces. PDOT has incorporated ODOT's avoidance and minimization measures and best management practices (BMPs), with one exception. The ODOT Guide states that "Where possible, ODOT will perform surface work in dry weather, to minimize any runoff of potentially hazardous material." PDOT conducts surface work throughout the year. During the winter months, PDOT performs base repair on localized street failures, grinding and paving localized areas, and patchwork. BMPs performed by PDOT during this work, in addition to those described in the ODOT Guide, include:
   - Emulsified asphalt (tack coat) is not applied during rain events.
   - Catch basin grates are covered with either rubber mats or protected with other appropriate materials to prevent sediment and pollutants from entering the storm sewers during the work activity.
   - Street base repair is an activity that is conducted during the rainy season. During Fiscal Year 00-01, PDOT performed 66,000 square yards of base repair. Crew members protect catch basins by either covering the inlets with rubber mats, or placing biobags in front of them to protect the storm sewer system. When the asphalt and soft sub-grade soils are removed, they are placed directly in the back of a dump truck and removed from the site. Fallen material is quickly swept back into the excavation. Base rock is placed directly into the excavation. No onsite stockpiling occurs during this activity. As a result of these measures, minimal, if any, amounts of sediment leave the work site.
   - Grinding of streets occurs during the winter months in preparation for the paving season, which occurs during the drier months. During fiscal year 00-01, PDOT ground approximately 70 lane miles. Minimization and avoidance measures include storing the equipment overnight on a geotextile fabric mat to contain any leaks from equipment. PDOT also cleans the grinder several times a week. During the washing activity, any inlet to the sewer system is protected with a biobag or biopillow and an absorbent boom to a minimize the amount of material entering the sewer system. The crews carry oil pillows and other spill kit and erosion materials on their trucks.

2. **Shoulder blading/rebuilding**. This activity includes shoulder blading and rebuilding to correct rutting and buildup of materials, to remove vegetation, for safety, and to maintain proper drainage. PDOT has adopted ODOT's minimization and avoidance measures and

BMPs. PDOT will install check dams to protect sensitive resources, when appropriate. PDOT will modify the width of the blading activity to minimize disturbance of vegetation, where appropriate. Where possible, PDOT will blade in dry weather, but while moisture is still present in the soil and aggregate to minimize dust. Where appropriate, PDOT will permanently stabilize disturbed soils using seeding, plants, *etc.* Other BMPs from ODOT's Guide have also been adopted by PDOT.

3. **Ditch shaping and cleaning**. A ditch is a facility, typically parallel to a road, that carries stormwater runoff draining from the PDOT facility and adjacent properties. It is not a channelized stream or fish-bearing waterbody. This activity includes the use of equipment for cleaning and reshaping ditches, including loading, hauling, and disposing of excess materials. This activity is performed in all weather. PDOT has adopted ODOT's minimization and avoidance measures and BMPs. Material is removed to an appropriate location for disposal or storage, above the bankline and away from any waterway or wetland. Vegetation in the ditch is removed during cleaning. Erosion control devices such as check dams, scour pads, biobags and broadcast straw will be used when there is the potential from sediment or other materials to enter a waterbody. Integrated Vegetation Management (IVM) plans will be used, and PDOT will reseed drainage ditches and steep slopes incorporating appropriate erosion control techniques. The activity will be timed to avoid or minimize sediment inputs to waterbodies. Modify ditch slopes to trap sediments and support development of vegetation, where appropriate. Excavated materials will be recycled when feasible.

4. **Sweeping/flushing**. This activity includes sweeping and minimal water application on roadways, curbs, and bridge decks to remove dirt and debris, and also includes scupper cleaning. Scupper cleaning involves sweeping material away from clogged scuppers, and clogged scuppers are normally freed using a steel rod. PDOT would adopt many of ODOT's BMPs. PDOT would use water to reduce dust during sweeping, and stores and disposes of removed material at an appropriate site, and will recycle sweeping materials where appropriate. Where feasible, PDOT would coordinate crews to follow sweeping/flushing with bridge drainage cleaning. As well, PDOT would remove sweepings produced within 25 feet of identified sensitive spawning areas.

   The ODOT Guide states that "Where feasible, ODOT Maintenance will schedule sweeping during damp weather, to minimize dust production." PDOT currently sweeps city streets six days of the week, year round, employing both a day and a night shift. The day shift sweeps the residential streets while the night operations crews sweep the arterial streets and the city downtown core areas. PDOT has determined that year-round sweeping is more protective of water quality and fish since approximately 25,000 cubic yards of street sweepings are collected annually. This street debris, consisting of trash, sediment with attached pollutants, and organics might otherwise make its way to surface water. Instead, this pathway is greatly diminished.

The City's sweeper machines are also equipped with a spray system to minimize the amount of dust generated from this activity. When possible, streets are premoistened in an effort to mobilize materials from the crown of the road to the gutter line. This improves the effectiveness of the street sweeping process.

5. **Culvert/inlet cleaning, repair, miscellaneous hand/minor repair**. This activity includes clearing of dirt and debris from culvert inlet/outlets to restore function, and repair of damaged passing devices (culverts, siphons, tidegates, box culverts, catch basins, drop inlets). Culvert cleaning equipment includes backhoes, vactor/jet router and shovels. Vegetation may be removed during cleaning, and the activity is conducted during all weather. It may include the removal of beaver dam material that clogs culverts. PDOT has adopted the ODOT minimization and avoidance measures and BMPs. PDOT will install erosion and sediment control devices during cleaning when possible. Materials will be disposed of above the bank line and not in any waterbody. When possible, PDOT will work during low flow, and may divert flow to minimize turbidity. If the work is performed in flowing water, it will be completed during the ODFW in-water work window, or as negotiated with ODFW.

6. **Erosion repair**. This activity involves repairing water damage to roadways and fillslopes. It includes using new and on-site soils to restore the slope and grade lines. In-water work may require replacement of riprap and gabion baskets. PDOT has adopted ODOT's minimization and avoidance measures and BMPs. Any installation of material (either soil or rock) that exceeds the amount of material lost due to erosion is not covered by this program. This activity will consider the use of bioengineering solutions where practicable. PDOT will also consider the hydraulics of the system during the design of the solution so as to minimize future erosion. Removed materials will be disposed of at appropriate locations well away from waterbodies. PDOT will respond to erosion problems in a timely manner, including seeding and mulching specific areas with non-invasive weeds, installing silt fences, *etc.*, to minimize erosion over the long term.

7. **Channel maintenance**. A channel is a facility that collects drainage water, can be parallel or perpendicular to the road, and may or may not be a natural stream. This is different than a ditch. The activity includes cleaning and repairing existing channels, including placing riprap to restore and grade. PDOT has adopted ODOT's minimization and avoidance measures and BMPs. New sections of riprap placement in streams is not part of this activity. During replacement of riprap in stream, PDOT will attempt to employ bioengineering solutions where appropriate. Excess material will be removed from channels after maintenance actions are completed, and the excess material will be deposited away from waterbodies. When maintenance work is needed in systems supporting sensitive fish species, PDOT will perform the work during the ODFW in-water work window, or as negotiated with ODFW.

8. **Fish restoration**. This activity includes any work associated with planting vegetation along a stream and slope stabilization work that incorporates bioengineering into existing

riprap, or new bioengineered slopes. This activity can also include modification of an existing drainage ditch for better water quality control. The avoidance and minimization measures and BMPs are the same as for ditch shaping and cleaning (activity # 3) and erosion repair (activity #6).

9. **Fish betterment**. This activity includes installation of baffles or weirs for fish passage, construction of berms or detention facilities, installation of deck curbs, new culverts or jump pools for fish passage. PDOT has adopted ODOT's minimization and avoidance measures and BMPs, including measures developed for culvert and inlet repair and cleaning (activity #5).

10. **Bridge maintenance and repair**. This is a large category of maintenance activities, including drift removal, and maintenance and repair of bridges and culverts larger than six feet in diameter. Drift removal and channel clearance activities are also addressed under bridge maintenance; this is done to protect in-water structures from hazardous debris. Drift removal involves either using boats to maneuver the drift, hydraulic tongs to reach over the side of the structure and dislodge the material, or pulling the drift from the side of the bridge and cutting it into pieces. Maintenance and replacement of structures includes washing, painting, scraping and patching of curbs, rails, deck joints, on wood, concrete and steel bridge components. In-water bridge repair can include repair or replacement of riprap, drainage features and catch basins, and replacement of structural members.

    PDOT has adopted ODOT's minimization and avoidance measures and BMPs, including restricting in-water activities to the ODFW in-water work window (except when there is imminent danger to life, limb or structure). Drift removal actions would attempt to leave the material in the water, would repair and restore riparian areas temporarily impacted by machinery. BMPs for bridge cleaning focus on protecting water quality through timing of work, blocking deck drains, and collection of material. Bridge repairs that require installation of riprap will consider the use of bioengineering solutions. Other BMPs address the disposal of materials, using cofferdams, containing waste, protection of water from fresh concrete, avoiding the use of treated wood.

11. **Mowing, brush mowing, brush cutting**. These activities are designed to restore and maintain sight distance, reduce ice on roadways due to shading, and to control and prevent slope failure. This includes mechanical mowing, trimming, removal of brush, and cleanup. PDOT has adopted ODOT's minimization and avoidance measures and BMPs. Local mowing areas are identified, and designed to minimize impacts to receiving waters while still maintaining grassed areas. Cut brush will be left in place in riparian areas where it does not create a safety issue or hazard, or involve noxious weeds or drainage problems. Mowing will be limited to no more than eight feet off the edge of the pavement in significant resource areas, unless needed to maintain drainage. Shade trees along waterways will be maintained, unless they are determined to be a danger tree.

Removed trees will be replanted at a 2:1 ratio. Mowing will be limited around bridges and culverts.

12. **Accident clean-up**. This activity includes the removal of accident debris, and may include response to hazardous spills. Upon knowledge of an incident, PDOT's prioritized responsibilities consist of roadway maintenance and public safety, and ensuring that the appropriate cleanup is properly performed as identified in local accident response procedures.

13. **Guardrail repair and replacement**. This activity involves repair and replacement of existing guardrail sections. In unstable situations, areas downslope from guardrail replacement will be protected with erosion control measures (silt fences and other appropriate devices) where appropriate to minimize additional sediment loadings into aquatic systems. This activity does not involve installation of new pavement. All attenuators within the City of Portland have been replaced with foam-filled material–replacing the original attenuators which were filled with antifreeze.

14. **Snow/ice removal/sanding**. This activity consists of plowing snow and ice from bridges, roadways and shoulders. Sanding puts sand on road and bridge surfaces. Anti-icers and de-icers are also used. PDOT has adopted ODOT's minimization and avoidance measures and BMPs with one exception. After a storm, ODOT sidecast sweeps the sand, with the sand collected on the sides of the roads with a re-use or trap efficiency of 10 to 50 %. In contrast, after a storm, PDOT sends out street sweepers that pick up approximately 95 % of the sand applied on snow routes with curbs. The sand is then brought to the city's recycling facility where it is washed and made available for ruse during the next snow event.

    Activities are restricted adjacent or near streams and bridges, and appropriate use of materials is required. Best management practices are designed to reduce sediment loading to sensitive areas, reduce the chemical loading to sensitive areas, reduce the occurrence of vehicles from leaving the road surface, and minimize pollutants resulting from vehicle accidents such as petroleum and hydrocarbon products, heavy metals, and road washoff from entering storm drainage and stream systems.

15. **Emergency maintenance**. This activity addresses repairing damage within the right-of-way caused by storms, floods and other unanticipated events. Failure to perform these activities may result in immediate threat to life, limb or structures. PDOT has adopted ODOT's minimization and avoidance measures and BMPs. The BMPs address erosion, impact of wetland and stream morphology, disposal of material, the potential for fuel spills, and remedial actions using bioengineering and fish friendly designs.

16. **Settlements and slides**. This activity includes repair of settlements and slides by placing fill and removing material. Settlements/slide repairs are done primarily when a road is in danger of collapse, and to forestall an emergency. PDOT has adopted ODOT's

minimization and avoidance measures and BMPs. The emergency action (activity #15) and erosion repair (activity #6) minimization and avoidance measures will be followed.

17. **Extraordinary maintenance**. This activity includes work which is extraordinary, but not specifically identified as a separate activity. Examples include: military operations, fire response, cleaning benches, transient housing control and cleanup, sumps, broken water line repair and cleanup. PDOT has adopted ODOT's minimization and avoidance measures and BMPs. PDOT will ensure that sediment and other materials do not enter waterbodies during these activities, and will repair any damage to fish habitat caused directly by PDOT actions.

18. **Stockpiling**. This activity addresses stockpiling materials for PDOT maintenance actions. PDOT has adopted ODOT's minimization and avoidance measures and BMPs. PDOT will develop site plans for areas beside or near riparian areas to identify erosion and sediment control needs, and to ensure stability of the material. Sites will be identified as part of the local disposal plan.

In addition to the activities described above, the proposed RRM Program includes training, monitoring and tracking of the Program, and documentation and reporting. PDOT, Bureau of Maintenance (BOM) is responsible for training the 400 employees on staff. Part of the training would address water quality issues and best management practices. All BOM field employees will receive training on appropriate BMPs for their work area. Key elements of training include:

- New employee orientation
- Monthly Pollution Prevention Manager meetings
- Bi-monthly Pollution Prevention Field Crew meetings
- Erosion and sediment control training
- Spill clean-up kit training
- Participation in professional symposiums/conferences
- Water quality awareness training
- Endangered Species Act awareness training
- National Pollutant Discharge Elimination System (NPDES) requirements training
- ODOT Guide for best management practices training

Each year, as part of the budget process, training needs for the following fiscal year would be identified and a schedule developed. Training would be tailored to meet the needs of the specific divisions, *e.g.*, street cleaning, sewers, and traffic electrical. Some of the training would be provided annually while other training would be provided on a less frequent basis. Training would be provided by both in-house staff and contractors. Training opportunities would be scheduled throughout the year, depending on the workload demands of the various crews and the availability of trainers. City crews may also have the opportunity to attend training sessions provided by other jurisdictions. Training that meets BOM’s environmental goals would be mandatory and crews would be released from their regular work to attend the training.

In addition to the training given to employees, each section in BOM would have regularly scheduled section meetings. At these meetings, section members would discuss other environmental issues that arise in-between training. The BOM would evaluate its training program on an on-going basis, constantly seeking out new opportunities for teaching and training.

PDOT funds an Environmental Team within the BOM. This team currently consists of one full time Environmental Engineer, an Environmental Program Specialist, and a part-time Project Manager. The team members may change through time, however, the responsibilities will remain the same. The team is responsible for providing leadership in setting BOM cultural direction and for ensuring that PDOT is in compliance with all Federal, state, regional and local environmental laws and mandates. The Environmental Team is also responsible for working with BOM's Manager of Training and Employee Development to develop the training program, ensure that training is funded, and to modify the training program as new needs are identified.

PDOT staffs a communications center at its BOM facility. The communication center operates 24 hours a day, 365 days a year, and receives calls and complaints from the public about problems or emergencies in the field. In addition, managers receive calls from other bureaus and the public regarding additional problems and concerns. Most calls are logged into an electronic tracking system. Staff investigates the calls, determining which calls should be turned into work orders. In this way, PDOT is continually monitoring and responding to public feedback. In addition, the Bureau of Development Services is responsible for code enforcement of erosion control. Finally, two City teams oversee implementation of the NPDES permits and are responsible for evaluating current practices and activities and recommending changes, and monitoring runoff management programs and pilot projects. Both teams serve as a bridge between field operations and management, and support the application of awareness training principles to field operations.

The City of Portland proposes to follow the documentation/reporting process included in the ODOT Guide. PDOT currently prepares and submits an annual Operations and Maintenance report as part of the City's NPDES permit. This annual report summarizes the activities of the prior year including training and new best management practices. The City of Portland also plans to combine the annual reports for the Municipal Separated Storm Sewer System requirements under the Clean Water Act and for the RRM Program into a single report. The report will document:

- Investigations of complaints received from or by City staff, other agencies, or members of the public concerning impacts to the environment by maintenance activities.
- Modifications of, or improvements to, any minimization/avoidance actions including summaries of challenges or successes in applications.
- Compliance reviews of any construction projects undertaken by the BOM.
- Overall summary of contacts and coordination with ODFW and NOAA Fisheries.(*i.e.*, communications may address deviations from the BMPs under certain circumstances, or changes in BMPs to improve water quality or habitat conditions).

Every five years, the City of Portland would evaluate the need to rewrite the manual. The decision would be based on the number of substantive changes needed and new technologies to be incorporated.

Before approving a new RRM Program, or approving any substantive change, NOAA Fisheries would publish notification in the Federal Register announcing the availability of the RRM Program or the draft changes for public review and comment. Such an announcement would provide for a comment period of not less than 30 days.

Periodically, NOAA Fisheries would evaluate the approved RRM Program for its effectiveness in maintaining and achieving habitat function that provides for the conservation of listed salmonids. When warranted, NOAA Fisheries would identify to the City of Portland ways in which the RRM Program could be altered or strengthened. Changes may be identified if the RRM Program is not protecting desired habitat functions, or where even with the habitat characteristics and functions originally targeted, habitat is not supporting population productivity levels needed to conserve the ESU. If the City of Portland does not make changes to respond adequately to the new information in the shortest amount of time feasible, but not longer than 1 year, NOAA Fisheries would publish notification in the Federal Register announcing its intention to withdraw the limit so that take prohibitions would then apply to the City of Portland's RRM Program. Such an announcement would provide for a comment period of no less than 30 days, after which NOAA Fisheries would make a final determination whether to subject the activities to the ESA section 9(a)(1) take prohibitions.

Finally, the RRM Program would meet the ESA mandate to provide for the conservation of the listed ESUs. It is important to note that a RRM program approved by NOAA Fisheries would not authorize RRM activities per se; the City of Portland would continue to regulate their RRM activities. However, the Limit 10 (i) criteria offers the City of Portland an additional option for pursuing RRM activities that avoids possible liability under the ESA while providing NOAA Fisheries with an additional management tool for conserving listed species. This alternative supports the NOAA Strategic Plan.

1.3 Action Area

The action area is defined in 50 CFR 402.02 to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The City of Portland currently implements its routine road maintenance activities on all City roads and facilities that fall under their jurisdiction. The City covers an area of 130 square miles, and includes 3,808 lane miles of street and 180 bridges. It does not include city roads or bridges that are owned and maintained by jurisdictions other than the City of Portland (*e.g.*, ODOT, Multnomah County). This road network includes both paved and gravel surfaces, as well as 206 miles of bike lanes and many culverts. The county also has jurisdiction over activities occurring in their right-of-way. Because of potential direct and indirect effects on listed salmonids from implementation of the RRMP, the action area extends to all roads and rights-of-way maintained by the City of Portland, Oregon, and the waterbodies downslope and downstream of the roads that have the potential to be affected by maintenance activities. It includes all reaches of the Willamette River and Columbia River within the City, plus all tributaries to the Willamette River and Columbia River within the City that either provide habitat to listed salmonids or deliver water to occupied habitat.

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1 Status of ESUs and Habitat

The nine threatened salmonid ESUs found in the action area are at risk of becoming endangered. Their status has been attributed to many different factors, including harvest, operation of hatcheries, hydropower development, and destruction of habitat (Federal Caucus 2000, NOAA Fisheries 2003c, 2003d). Additionally, municipal and agricultural water withdrawals cause water shortages throughout the West, creating passage barriers, water quality declines, and eliminating habitat. Though less measurable, the effects of introduced aquatic nuisance species, which compete for habitat and prey on salmon, have caused a decline in salmon populations (He and Kitchell 1990). Recent research has shown that ocean conditions play a profound role in survival to spawning age, and contribute substantially to total salmon population numbers (Beamish *et al.* 2000).

The listing status and biological information for the four threatened species are listed in Table 2.

Table 2. References for Additional Background on Listing Status, Biological Information, and Protective Regulations for the ESA-Listed Species Considered in this Consultation.

Species ESU	Status	Protective Regulations	Biological Information, Historical Population Trends
Chinook salmon (*O. tshawytscha*)			
Lower Columbia River	3/24/99; 64 FR 14308	7/10/00; 65 FR 42422	Myers *et al.*1998; Healey 1991
Upper Willamette River	3/24/99; 64 FR 14308	7/10/00; 65 FR 42422	Myers *et al.*1998; Healey 1991
Snake River Fall-run	4/22/92; 57 FR 14653	4/22/92; 57 FR 14653	Waples *et al.* 1991; Healey 1991
Snake River Spring/Summer run	4/22/92; 57 FR 14653	4/22/92; 57 FR 14653	Matthews and Waples 1991; Healey 1991
Steelhead (*O. mykiss*)			
Lower Columbia River	3/19/98; 63 FR 13347	7/10/00; 65 FR 42422	Busby *et al.* 1995; 1996
Upper Willamette River	3/25/99; 64 FR 14517	7/10/00; 65 FR 42422	Busby *et al.* 1995; 1996
Middle Columbia River	3/25/99; 64 FR 14517	7/10/00; 65 FR 42422	Busby *et al.* 1995; 1996
Snake River Basin	8/18/97; 62 FR 43937	7/10/00; 65 FR 42422	Busby *et al.* 1995; 1996
Chum salmon (*O. keta*)			
Columbia River	3/25/99; 64 FR 14508	7/10/00; 65 FR 42422	Johnson *et al.* 1997; Salo 1991

Lower Columbia River Chinook Salmon

The threatened LCR Chinook salmon ESU includes all natural-origin populations residing below impassable natural barriers from the mouth of the Columbia River to the crest of the Cascade Range just east of Hood River in Oregon and the White Salmon River in Washington. The listing includes the Chinook salmon in the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River. Critical habitat is not presently designated for this ESU.

Estimated overall abundance of Chinook salmon in the ESU is not cause for immediate concern. Long-term trends in fall-run escapement are mixed, with most larger stocks positive, while the spring-run trends are positive or stable. Short-term trends for both runs are more negative, some severely so (Myers *et al.* 1998). However, apart from the relatively large and apparently healthy fall-run population in the Lewis River, production in this ESU appears to be predominantly hatchery-driven with few identifiable native, naturally-reproducing populations. About half of the populations constituting this ESU are very small, increasing the likelihood that risks due to genetic and demographic processes in small populations will be important.

Spawning and juvenile rearing areas have been eliminated or greatly reduced by dam construction, and freshwater habitat is in poor condition in many basins due to forestry practices, urbanization and agriculture. Also of concern is the potential loss of fitness and diversity resulting from the introgression of hatchery fish within the ESU (Myers *et al.* 1998).

Upper Willamette River Chinook Salmon

The threatened UWR Chinook salmon ESU includes native spring populations in the Willamette River and tributaries upstream of Willamette Falls, including naturally-produced spring-run fish in the Clackamas River. Critical habitat is not presently designated for this ESU.

The abundance of naturally-produced spring-run Chinook in the ESU has declined substantially from historic levels. Historic escapement levels may have been as high as 200,000 fish per year (Myers *et al.* 1998). Current natural escapement is less than 5,000 fish, and about two-thirds of the natural spawners are estimated to be first-generation hatchery fish (Myers *et al.* 1998). Although natural escapements are substantially depressed, the number of naturally-spawning fish have gradually increased in recent years (NMFS 2001).

The primary cause of decline of Chinook in this ESU is the blockage of access to large areas of spawning and rearing habitat by dam construction. The remaining habitat has been degraded by thermal effects of dams, forestry practices, agriculture, and urbanization. Another concern for this ESU is that commercial and recreational harvest have been high relative to the apparent productivity of natural populations. New fishing regulations are expected to reduce harvest mortality by 70% from historic levels. Efforts have been taken to remedy some of the past hatchery practices including limiting the proportion of hatchery spawners in some natural production areas, and reincorporating local-origin wild fish into the hatchery broodstock.

Upper Willamette Steelhead

The UWR steelhead ESU includes all naturally-produced steelhead in the Willamette River and its tributaries upstream of Willamette Falls. No estimates of abundance before the 1960s are available. Abundance has been declining steeply since the late 1980s going from an average of over 15,000 in the 1970s and 1980s to several thousand today (Busby *et al.* 1996). Critical habitat is not presently designated for this ESU.

The potential negative influence of hatchery fish through genetic effects and competition between native and non-native stocks was noted as the primary factor of concern for this ESU (Busby *et al.* 1996). Habitat blockage from dams and habitat degradation from logging and urbanization have contributed to stream flow and temperature problems and loss of riparian habitat (Bottom *et al.* 1985, Busby *et al.* 1996).

Lower Columbia River Steelhead

The threatened LCR steelhead ESU includes all naturally-produced steelhead in tributaries to the Columbia River between the Cowlitz and Wind Rivers in Washington and the Willamette and Hood Rivers in Oregon, excluding steelhead in the Willamette River above Willamette Falls and steelhead in the Little and Big White Salmon Rivers in Washington (Middle Columbia ESU) (Busby *et al.* 1996). Critical habitat is not presently designated for this ESU.

No estimates of historical abundance (pre-1960s) specific to this ESU are available. A conservative estimate of current abundance puts the average run size at greater than 16,000. Abundance trends are mixed and possibly affected by short-term climate conditions. At the time of NOAA Fisheries' status review (Busby *et al.* 1996), the majority of stocks for which data were available within this ESU were declining, although some had increased strongly. Since 1996, listed LCR steelhead populations have generally increased, with some populations rebounding more quickly than others.

The magnitude of hatchery production, habitat blockages from dams, and habitat degradation from logging and urbanization are areas of concern. The widespread production of hatchery steelhead within this ESU creates specific concerns for summer steelhead and Oregon winter-run steelhead stocks, where there appears to be substantial overlap in spawning between hatchery and natural fish (Busby *et al.* 1996). Most of the hatchery stocks originate from stocks within the ESU, but many are not native to local river basins.

Snake River Fall-run Chinook Salmon

Historically, fall Chinook salmon were widely distributed in the Snake River basin and many of its major tributaries from the confluence with the Columbia River, upstream 615 miles to Shoshone Falls, Idaho. The present distribution represents only a small fraction of the former range for this ESU. Spawning and rearing habitat was significantly reduced by the construction of a series of Snake River mainstem dams. Critical habitat is described in detail in the Federal Register (58 FR 68543) and includes the Columbia River in the action area. Adult fall Chinook salmon are present in the lower Columbia River in August through early October, with the peak in the action area during the first two weeks of September. No adults from this ESU are expected to occur upriver in the Willamette River beyond the mouth. Juveniles from this ESU are expected to travel downstream through the action area in the Columbia River from late June to late September, with the peak occurring from early July to early August. A few juveniles from this ESU may move into the lower Willamette River for short periods, but no extended use of the Willamette River has been documented.

Snake River Spring/Summer-run Chinook Salmon

Matthews and Waples (1991) estimated that in some years during the late 1800s, escapement of adult spring/summer Chinook salmon to the Snake River was in excess of 1.5 million. As a result of natural and anthropogenic factors, the number of returning adult spring/summer Chinook salmon began to plummet. By the 1950s, fish counts for this ESU report an average of 125,000 per year (Fulton 1968). In 1994, only 3,120 spring Chinook and 795 summer Chinook adults returned to the Lower Granite Dam (FPC 2003). Returns have rebounded significantly over the past three years, with estimates at Lower Granite Dam totaling 75,025 at Lower Granite Dam (FPC 2003). However, a large proportion (up to 98 %) of the run is estimated to be of hatchery origin (NOAA Fisheries 2003c).

Critical habitat for this ESU includes the Columbia River to the Clatsop jetty, all of the estuarine areas and river reaches upstream to the confluence of the Columbia and Snake Rivers (58 FR 68543). Critical habitat includes the water, river bottom and adjacent riparian zone (300 feet from the normal line of high water.

Peak adult migration timing for this ESU through the Portland area on the Columbia River is from early April to mid May and from late June to early July. Yearling smolts tend to move more rapidly downstream than the fall-run fish. Many of the Snake River yearling Chinook outmigrants are transported by barge or truck around Snake River and Columbia River dams and released downstream from Bonneville Dam. Juveniles from this ESU are expected to pass through the Portland area from mid-June to late September, with the peak occurring from mid-July to mid-August.

Middle Columbia River Steelhead

Over the past 34 years, continued declines in steelhead abundance and increases in the percentage of hatchery fish in natural escapements have resulted in a risk to the ESU. Adult fish from this ESU could be in the Portland area from April through January, with juvenile downstream migration within the interval from late March through June, with peak abundance occurring from late April through mid-May.

Snake River Basin Steelhead

Historic (pre-1960s) information on run size is not available. Total (hatchery + wild) run size has increased since the mid-1970s. However, there was a severe decline in widle run size in the early to mid 1990s. The five-year average escapement above Lower Granite Dam between 1990 and 1995 was approximately 71,000 fish, with a wild component of 9,400 fish. Returns have increased in the last few years. Furthermore, a substantial percentage of the hatchery component of the run escapes to spawn naturally throughout the region. This represents a major threat to the genetic integrity for steelhead in this ESU. Juvenile downstream migration through the Portland area occurs from April through June, with the peak in May. The adult return timing in the Portland area is from June through November, with the peak occurring in June and July.

Columbia River Chum Salmon

In the Columbia River basin, chum salmon runs historically may have occurred as far inland as the Walla Walla River in eastern Washington (Johnson *et al.* 1997). Presently, the distribution in the Columbia River is restricted to tributary streams, and the mainstem downstream of Bonneville Dam. Three streams on the Washington side of the river (Hamilton Creek, Hardy Creek, Grays River) support native spawning populations, while 23 small native populations have been identified from streams on the Oregon side of the river (Kostow 1995). A small population has recently been discovered utilizing two spawning locations in the mainstem Columbia River on the Washington side, just upstream of the I-205 bridge. These habitats consist of a near-shore, spring-seep area normally accessible on high tides and a deeper water location just upstream.

Chum salmon were once abundant in the lower Columbia River and supported a substantial commercial fishery. These landing represented a harvest of more than 500,000 chum salmon in some years. The population crashed in the 1950s and has remained relatively stable since that time. The total number returning to the Columbia in the last 50 years has averaged perhaps a few thousand, returning to a very restricted subset of the historical range. Presently there are no directed recreational or commercial fisheries for chum salmon in the Columbia River. The NOAA Fisheries status review concluded that the Columbia River chum salmon ESU is presently at significant risk of becoming endangered in the foreseeable future (Johnson et *al.* 1997). Within the action area, chum salmon are only expected to occur in the Columbia River and its tributaries, but not in the Willamette River system.

2.1.2 Evaluating the Proposed Action

The standards for determining jeopardy and destruction or adverse modification of critical habitat are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations combined with the Habitat Approach (NMFS 1999): (1) Consider the status and biological requirements of the species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species and whether the action is consistent with the available recovery strategy; (4) consider cumulative effects; and (5) determine whether the proposed action, in light of the above factors is likely to appreciably reduce the likelihood of species survival in the wild or destroy or adversely modify critical habitat. In completing this step of the analysis, NOAA Fisheries determines whether the action under consultation, together with cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

For the proposed action, NOAA Fisheries' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NOAA Fisheries' analysis considers the extent to which the proposed action impairs the function of essential elements necessary for migration, spawning, and rearing of listed species under the existing environmental baseline.

2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species, taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to a naturally-reproducing population level, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful adult and juvenile migration, juvenile rearing, and adult spawning. Survival in the wild of the listed ESUs depends upon the proper functioning of certain ecosystem processes, including habitat formation and maintenance. Restoring functional habitats depends largely on allowing natural processes to increase their ecological function, while removing adverse impacts of current practices. In conducting analyses of habitat-altering actions, NOAA Fisheries defines the biological requirements in terms of a concept called Properly Functioning Condition (PFC) and applies a "habitat approach" to its analysis (NMFS 1999). The status of the listed ESUs discussed in Table 2, based upon their risk of extinction, has not significantly improved since the species were listed.

The specific biological requirements affected by the proposed RRMP include food availability and habitat attributes including water quality, flow/hydrology, habitat access and migratory impediments, riparian elements and channel condition and dynamics.

2.1.4 Environmental Baseline

In step 2 of NOAA Fisheries' analysis, we evaluate the relevance of the environmental baseline in the action area to the species' current status. The environmental baseline is an analysis of the effects of past and ongoing human-caused and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. The action area is defined by NOAA Fisheries regulations (50 CFR 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

For the purpose of this consultation, the action area includes all waters throughout the City of Portland within the range of the nine threatened salmon and steelhead ESUs. As defined above, the action area extends to all roads and rights-of-way maintained by the City of Portland, Oregon, and the waterbodies downslope and downstream of the roads that have the potential to be affected by maintenance activities. It includes all reaches of the Willamette River and Columbia River within the City, plus all tributaries to the Willamette River and Columbia River within the City that either provide habitat to listed salmonids or deliver water to occupied habitat. The action area may extend upstream or downstream of maintenance activities, based on their potential to affect fish passage, riparian succession, the hydrologic cycle, erosion, the transportation and deposition of sediments, and other ecological processes related to the formation and maintenance of salmon habitats. Indirect effects may occur throughout the watershed where other activities depend on RRMP activities for their justification or usefulness. The major factors influencing the environmental baseline within the action area include habitat modifications, hatchery practices, and harvest management.

Habitat

The City of Portland is within the Willamette River watershed, and the Columbia River watershed. The Willamette River watershed covers a vast area (764,439 acres) bordered on the east and west by the Cascades and the Pacific coast ranges. It is the tenth largest river in the contiguous United States in terms of streamflow. It drains from as far south as Cottage Grove, Oregon, and flows north to its confluence with the Columbia River. The Willamette River watershed is the largest river basin in Oregon. It is home to most of the state's human population, its largest cities, and many major industries. The watershed also contains some of Oregon's most productive agricultural lands and supports important fishery resources (City of Portland 2001).

The uplands (Coast and Cascade ranges) receive about 80% of the precipitation falling on the Willamette River basin, and store much of this water as snow. Ecosystem productivity in these upland streams is relatively low, with aquatic insects gleaning much of their diet from material that falls into running water. In larger, slower tributaries, more plant material is produced in the stream itself. The mainstem supports a highly productive algal community that blooms as temperatures rise in the summer. Insects and some vertebrates feed on these plants, and many vertebrates, including salmonids, feed on stream-dwelling insects and zooplankton.

Significant changes have occurred in the watershed since the arrival of Europeans in the 1800s. The watershed was mostly forested before the arrival of white settlers. Now, about half the basin is still forested. One-third of the basin is used for agriculture, and about 5% is urbanized or is in residential use. The river receives direct inputs from treated municipal wastes and industrial effluents. Nonpoint source input from agricultural, silvicultural, residential, urban and industrial land uses are also significant, especially during rainfall runoff. Much of the habitat for Willamette River salmonids has been degraded by various land use practices or eliminated by dams.

Wild salmonid populations have declined precipitously over the last century in the Willamette River (WRI 1999). The population changes have been attributed to myriad factors, including habitat functional quality and availability. Both natural and human-induced activity have contributed to the decline.

While human disturbances may have minimal impacts individually, the number, magnitude, duration, and cumulative impacts since Euro-American settlement combine to form the primary cause of the decline of numerous salmon stocks in fresh water. Historical and current human-caused disturbances include: (1) Clearing and channelizing rivers; (2) sending logs down streams via splash dams; (3) extensive land clearing; (4) diverting water; (5) livestock grazing in waterways; (6) mining run-off; (7) constructing logging roads and accelerating erosion; (8) removing old growth forests; (9) filling and diking of wetlands and estuaries; (10) armoring shorelines and streambanks; (11) developing hydroelectric dams; (12) creating barriers to fish migration; (13) increasing surface run-off; (14) contaminating water and sediments; (15) introducing non-native plants and animals; (16) changing levels of oxygen and nutrients in waterways; and (17) over-fishing.

The lower Willamette River is a tributary to the Columbia River at approximately river mile 102. Many of the state's heaviest industrial users are present in the lower Willamette watershed. Land uses in the basin upstream of Portland include timber production, grazing, irrigated and dryland agriculture and urban areas. Within the Portland downtown and harbor areas, the river's banks are typically steep and are primarily composed of bank stabilization and fill materials such as sheet pile, riprap, seawall and concrete fill. Riparian vegetation is generally sparse to absent, and frequently consists of nonnative plants and shrubs.

The lower Willamette watershed is heavily degraded relative to historical conditions. Historically, the Willamette River in the Portland area comprised an extensive and interconnected system of active channels, open slack waters, emergent wetlands, riparian forest and adjacent upland forest on hill slopes and Missoula Flood terraces. Connectivity of habitat was high both longitudinally along the river and laterally from the vegetated riverbanks to the upland forests.

Gradually, habitats along the Willamette River have been destroyed, degraded or disconnected through construction of dams throughout the Willamette and Columbia rivers and from development along the Willamette. Large expanses have been filled and developed, leaving small strips of riparian forest, wetland and associated upland forests. These remnants are few or entirely lacking for large reaches through the downtown and industrial segments of the river. Most of the historical off-channel habitats have been cut off from the channel and filled. Connectivity and maintenance of these habitats have been reduced or eliminated as a result of marked alteration of the seasonal hydrograph, particularly the dramatic reduction of peak flows. Connection to many of the tributary habitats has been eliminated or reduced by culverts.

The Willamette River has been diked and dredged throughout the Portland Harbor. The urban setting minimizes the presence of riparian vegetation and the input of new large wood from riparian areas. Fertilizers, pesticides, petroleum products and other industrial, agricultural, and urban contaminants have degraded water quality in the City of Portland. The Portland Harbor was added to the National Priorities List (*i.e.*, Superfund) in 2000 for elevated levels of DDT, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and heavy metals. In addition, the lower Willamette River has been designated as water quality limited by the Oregon Department of Environmental Quality (DEQ) in accordance with the Clean Water Act of 1972 (on the 303(d) list) for temperature, bacteria, biological criteria (fish skeletal deformities), and toxics.

The aquatic biota of the lower Willamette River have changed significantly from historical conditions with many non-native species present in substantial numbers. The introduction of non-native species has been known to profoundly affect ecosystems by disrupting food webs and displacing native species. Because of a lack of natural predators or competitors, these introduced species can spread rapidly.

Tributaries to the Willamette River within the City of Portland include Johnson Creek, Fanno Creek, Tryon Creek, Balch Creek and others. Fish populations in these smaller streams have also been significantly modified compared to historic conditions as a result of urbanization and changes to habitat, water quality and hydrology. Some streams have been placed entirely into culverts, and other have been moved and channelized to accommodate urban development. Culverts and small dams have blocked or partially impeded fish passage, and water quality has declined with many 303(d) listings.

The City of Portland also borders the Columbia River. This river is the second largest river in the contiguous United States in terms of stream flow. Land uses within the lower Columbia River watershed are urban/industrial, residential and rural/agricultural. Many of the region's heaviest industrial users are present in the lower Columbia watershed. The watershed has been heavily urbanized and industrialized in the vicinity of Portland for decades, and has had many point source and nonpoint sources discharges. The south bank of the Columbia River in Portland is moderately urbanized. The banks are a mixture of steep natural cobble and sandbanks and riprap; riparian vegetation is generally sparse to absent and consists mostly of invasive plants and shrubs.

The lower Columbia watershed is degraded relative to historical conditions. River flow in the project area has been significantly altered from historical conditions as a result of the upstream storage reservoir releases and hydropower operations. The channel has been diked and dredged, and steep, riprapped shorelines along the river have reduced growth of riparian areas and recruitment of large wood. Most of the historical off-channel habitats have long since been cut off from the channel and filled. Silt and sand dominate the river substrate.

Water quality in the lower Columbia River is fair to poor in summer. Mainstem temperatures often exceed 68°F, and maximum temperatures can reach 79°F. The DEQ has listed the lower Columbia River, from the Willamette to the Bonneville Dam, as water quality limited for total dissolved gases and arsenic, temperature (summer), pH (spring), and toxics.

Habitat conditions in the lower Columbia River have been degraded as a result of extensive changes in flow, habitat and water quality. Many nonnative fish species have been introduced into the Columbia Basin. This has resulted in increased competition and local extinctions of some native species, and a reduction of the biotic integrity of the system.

One of the most pervasive changes within the City of Portland is the reduction in native tree canopy cover and an increase in impervious surfaces like roads, parking lots and rooftops. Impervious surfaces affect the amount of water that seeps into the ground and washes into streams; they also affect how quickly the water gets there (Paul and Meyer 2001). When trees are removed, the evapotranspiration rate declines, and more water reaches the streams quickly as surface runoff. When land is covered with pavement or buildings, the area available for rainwater and snowmelt to seep into the ground and replenish the groundwater is drastically reduced; in many urban areas it is virtually eliminated. The natural movement of water through the ground to usual discharge points such as springs and streams is altered. Instead, the natural flow is replaced by storm sewers or by more concentrated entrance points of water into the ground.

Changing the timing and amount of water run-off can lead to too much water going directly into streams in the rainy months of winter instead of soaking into the ground. Consequently, the ground does not have enough water to slowly release into streams in the dry months of summer. Too much water in the winter can cause fish habitat to be scoured by unnaturally swift currents; not enough water in streams in the summer leads to water temperatures too high to support fish. Studies show that when impervious surfaces such as pavement and buildings cover between 5 and 8% of a watershed, the health of streams and the fish in them declines, despite stormwater controls. In the City of Portland area, the watersheds are 20 to 40% covered with hard surfaces, altering stream flows, water temperatures, and instream habitat for everything from insects to fish.

Current RRMP activities affect peak and base flows in streams as a result of the permanent removal of vegetation, earth-clearing work and hydraulic modification work. Runoff of pollutants from roadways and accidental spills in work areas affects water quality indicators, including chemical contamination. Lack of sufficient erosion control measures can leave exposed soil susceptible to the erosive forces of flowing water. Excess sediment loading into receiving waterbodies and streams can impair gills of fish, smother eggs, embed spawning gravels, disrupt feeding and growth patterns of juveniles, delay upstream migration of adults, and scour nutrients from the stream substrate. Maintenance activities near streams disturb fish, causing them to temporarily abandon suitable habitat. The long-term or permanent removal of riparian vegetation can result in degraded water quality, *e.g.*, increased water temperature.

<u>Hatcheries</u>
For more than 100 years, hatcheries in the Pacific Northwest have been used to replace natural production lost as a result of hydropower and other development, not to protect and rebuild natural populations. As a result, most salmon populations in this region are primarily hatchery fish. In 1987, for example, 95% of the coho, 70% of the spring-run Chinook, 80% of the

summer-run Chinook, 50% of the fall-run Chinook, and 70% of the steelhead returning to the Columbia River basin originated in hatcheries (CBFWA 1990).

While hatcheries have contributed to the overall numbers of salmon, only recently has the effect of hatcheries on native wild populations been demonstrated. In many cases, these effects have been substantial. For example, production of hatchery fish, among other factors, has contributed to the 90% reduction in wild coho salmon runs in the lower Columbia River over the past 30 years (NMFS 2000a).

NOAA Fisheries has identified four primary categories of risk that hatcheries can pose on wild-run salmon and steelhead: (1) Ecological effects, (2) genetic effects, (3) overharvest effects, and (4) masking effects (NMFS 2000a). Ecologically, hatchery fish can increase predation on, displace, and/or compete with wild fish. These effects are likely to occur when fish are released in poor condition and do not migrate to marine waters, but rather remain in the streams for extended rearing periods during which they may prey on or compete with wild fish. Hatchery fish may also transmit hatchery-borne diseases, and hatcheries themselves may release diseases into stream via water effluents.

Genetically, hatchery fish can affect the genetic variability of native fish via interbreeding, either intentionally or accidentally. Interbreeding can also result from the introduction of native stocks from other areas. Theoretically, interbred fish are less adapted to, or productive within, the unique local habitats where the original native stock evolved.

In many areas, hatchery fish provide increased fishery opportunities. When wild fish mix with hatchery stock, fishing pressure can lead to overharvest of smaller or weaker wild stocks. Further, when migrating adult hatchery and wild fish mix on the spawning grounds, the health of the wild runs and the condition of the habitat's ability to support runs can be overestimated, because the hatchery fish mask surveyors' ability to discern actual wild run conditions.

Recent hatchery reforms include supplementation and reintroduction programs conducted to minimize adverse genetic, ecological, and demographic effects on naturally-produced salmonids. Monitoring and evaluation programs have been designed to identify the ecological and genetic effects of hatchery programs listed fish. The role of hatcheries in the future of Washington's salmonids is presently unclear; it will depend on the values people place on fish production and biological diversity. Clearly, conservation of biological diversity is gaining support, and the future role of hatcheries may shift toward judicial use of hatcheries to meet these goals rather than opposing them.

<u>Harvest</u>

Non-Indian fisheries began in about 1830 with the arrival of European settlers. By 1861, commercial fishing was an important economic activity that developed with the advent of canning technologies. The early commercial fishery used gill nets, seines hauled from shore, traps, and fish wheels. Later, purse seines and trolling (using hook and line) fisheries developed. Recreational (sport fishing) began in the late 1800s, occurring primarily in tributary locations (NMFS 2000a).

Whereas freshwater fisheries in Oregon were declining during the first half of the twentieth century, primarily due to high harvest rates, ocean fisheries were growing, particularly after World War II. This trend occurred up and down the West Coast as fisheries with new gear types leapfrogged over the others to gain first access to the migrating salmon runs. Large, mixed-stock fisheries in the ocean gradually supplanted the freshwater fisheries, which were increasingly restricted or eliminated to protect spawning escapements. By 1949, the only freshwater commercial gear types remaining were gill nets, dip nets, and hoop nets (NMFS 2000a). This leapfrogging by various fisheries and gear types resulted in conflicts about harvest allocation and the displacement of one fishery by another. Ocean trolling peaked in the 1950s; recreational fishing peaked in the 1970s. The ocean harvest has declined since the early 1980s as a result of declining fish populations and increased harvest restrictions.

The capacity of salmonids to produce more adults than are needed for spawning offers the potential for sustainable harvest of naturally-produced (versus hatchery-produced) fish. This potential can be realized only if two basic management requirements are met: (1) Enough adults return to spawn and perpetuate the run; and (2) the productive capacity of the habitat is maintained. Catches may fluctuate in response to such variables as ocean productivity cycles, periods of drought, and natural disturbance events. However, as long as the two management requirements are met, fishing can be sustained indefinitely. Unfortunately, both prerequisites for sustainable harvest have been violated routinely in the past. The lack of coordinated management across jurisdictions, combined with competitive economic pressures to increase catches or to sustain them in periods of lower production, resulted in harvests that were too high and escapements that were too low. At the same time, habitat has been increasingly degraded, reducing the capacity of the salmon stocks to produce numbers in excess of their spawning escapement requirements.

For years, the response to declining catches was hatchery construction to produce more fish. Because hatcheries require fewer adults to sustain their production, harvest rates in the fisheries were allowed to remain high, or even increase, further exacerbating the effects of overfishing on the naturally-produced (non-hatchery) runs mixed in the same fisheries. More recently, harvest managers have instituted reforms including weak stock, abundance based, harvest rate, and escapement-goal management.

Natural Conditions

Changes in the abundance of salmonid populations are substantially affected by changes in the freshwater and marine environments. For example, large-scale climatic regimes, such as El Niño, affect changes in ocean productivity. Much of the Pacific Coast was subject to a series of very dry years during the first part of the 1990s. In more recent years, severe flooding has adversely affected some stocks.

Salmon and steelhead are exposed to high rates of natural predation, particularly during freshwater rearing and migration stages. Ocean predation may also contribute to significant natural mortality, although the levels of predation are largely unknown. In general, salmonids are prey for pelagic fishes, birds, and marine mammals, including harbor seals, and killer whales. There have been recent concerns that the rebound of seal and sea lion populations, following their protection under the Marine Mammal Protection Act of 1972, has resulted in substantial mortality for salmonids.

A key factor substantially affecting many West Coast stocks has been the general pattern of a 30-year decline in ocean productivity. The mechanism whereby stocks are affected is not well understood. The pattern of response to these changing ocean conditions has differed among stocks, presumably due to differences in their ocean timing and distribution. It is presumed that survival is driven largely by events occurring between ocean entry and recruitment to a subadult life stage. Time-series of survival rate information for UWR spring Chinook, Lewis River fall-run Chinook, and Skagit fall-run Chinook salmon show highly variable or declining trends in early ocean survival, with very low survival rates in recent years (NMFS 2000a).

Recent evidence suggests that marine survival of salmonids fluctuates in response to 20- to 30-year cycles of climatic conditions and ocean productivity (Cramer *et al.* 1999). This phenomenon has been referred to as the Pacific Decadal Oscillation. Ocean conditions that affect the productivity of Oregon salmonid populations appear to have been in a low phase of the cycle for some time and to have been an important contributor to the decline of many stocks. The survival and recovery of these species will depend on their ability to persist through periods of low natural survival.

<u>Environmental Baseline Summary</u>

Notwithstanding improvements in hatchery, harvest and habitat management practices, environmental conditions in the action area are still generally poor with respect to salmonid survival in a number of their life stages. In fact, for many stocks, survival must improve by an order of magnitude in order for the ESUs to survive and recover. Smolt-to-adult return rates in 1998 for SR spring/summer-run Chinook, for example, were less than one-half of 1 %– about one-tenth the rate needed for sustainability (NMFS 2000a). The continuous and cumulative reduction in habitat productive capacity has influenced the ability of the nine threatened species within the City of Portland to recover by reducing population resiliency and lowering survival rates. Past road maintenance practices have contributed to the decline in habitat quality and availability, and the intent of the RRMP is to contribute to the improvement of some habitat components of the environmental baseline.

2.1.5 Analysis of Effects

NOAA Fisheries' ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline"(50 CFR 402.02). Direct effects are immediate effects of the project on the species or its habitat, and indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur (50 CFR 402.02).

The RRMP is a conservative program consisting of specific approaches to conducting routine road maintenance activities to ensure that road maintenance activities protect salmonids. The City of Portland is using the RRMP to effectively change their road maintenance activities to meet the ecological needs of listed salmonids, to the extent that routine road maintenance activities affect those needs. Nevertheless, road maintenance activities might affect elements of the environment in ways that have implications for listed salmonids.

A complete application package for qualification under 4(d) Limit (10)(i) includes a number of required items, including a detailed description of the program, training, tracking and reporting, and an affirmative conclusion that the program is substantially similar to and at least as protective as ODOT's program in its implementation. The application package for Limit 10(i) does not require a description of the manner in which the RRMP activities may affect listed species because if the program is substantially similar to ODOT's program, then the effects should be similar to ODOT's. Therefore, the City of Portland has not analyzed the effect of their RRMP on listed salmonids and their habitat, but presented information in their submittal to support their conclusion that their RRMP is substantially similar to ODOT's.

The intent of the RRMP is to avoid and minimize effects to listed salmonids and their habitat where possible, but the program is not expected to completely avoid effects. The effects of routine road maintenance activities are highly repetitive and predictable. A modified version of NOAA Fisheries' Matrix of Pathways and Indicators (MPI) is used to determine the effects of the RRMP on listed salmonids for this Opinion. The MPI identifies six conceptual pathways (*e.g.*, water quality, channel condition) of 18 habitat condition indicators (water temperature, width/depth ratio) for determining the effect of an action. This information is presented in Table 3 and addresses effects related to implementation of the RRMP. Activity-specific effects are also discussed below.

2.1.5.1 Clearing, Drilling, Excavating, Filling, Grading, Grubbing, Cleaning, Grinding, and Cutting

These activities include all work necessary to maintain roadways, streambanks, roadside ditches, culverts, catch basins, inlets, and detention/retention basins. In the City of Portland RRMP, these activities are covered under surface work, shoulder blading/rebuilding, culvert/inlet repair and cleaning, ditch cleaning, and erosion repair. This type of work is likely to have beneficial effects; cleaning out sediment and debris from drainage systems provides benefits to salmon habitat by preventing pollutants and sediments entrapped in stormwater facilities from entering surface or groundwater. There remains a possibility that these activities can also have adverse water quality impacts, directly affecting aquatic species. These impacts occur through the generation of sediments and side casting of windborne dust and paint particles. Clearing ditches, culverts, and drainage systems and grading shoulders can dislodge sediments and expose soils, allowing an increase of sediment transport during storm events.

Because stormwater conveyance systems often discharge into salmon habitat, the resultant temporary increase of sediment loads can adversely affect water quality in fish-bearing waters. Excess sediment loading and turbidity levels can clog gills of fish, smother eggs, embed spawning gravels, disrupt feeding and growth patterns of juveniles, delay up-stream migration of adults, and scour nutrients from the stream substrate (Burton *et al.* 1990).

Reported influences of increased suspended sediment and turbidity on fish range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates (Gregory and Levings 1988), and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and reduce survival (Bell 1991) and reduce cover for juvenile salmonids (Bjornn and Reiser 1991). Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure (not just the TSS concentration).

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (Birtwell *et al.* 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay *et al.* 1984, 1987, Sigler *et al.* 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish need to traverse these streams along migration routes (Lloyd *et al.* 1987).

Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. When turbidity is localized and brief, there is a low probability of direct mortality because the fish should be aware and agile enough to avoid any equipment used to repair the slope. However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991). Newly-emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985).

Table 3. The effect of routine road maintenance activities on indicators of the quality of salmon habitat in the City of Portland.

PATHWAY	INDICATOR	EFFECT ON IMPLEMENTATION OF THE CITY OF PORTLAND RRMP ON THE ENVIRONMENTAL BASELINE
Water Quality	Temperature	Removal of vegetation that can be associated with some maintenance activities may result in localized increases in water temperature. Efforts will be made to minimize the loss of vegetation close to streams, and mature trees removed will be replaced at a 2:1 ratio within the same watershed. Implementation of the RRMP should not result in an increase in stream temperatures over the long-term, and may contribute to a reduction in temperatures.
	Dissolved Oxygen	Increased turbidity can result from some maintenance activities that require in-water work. Increased turbidity can cause a decrease in dissolved oxygen. Increases in turbidity are expected to be localized and of short duration. Furthermore, appropriate repairs of unstable areas can decrease the input of sediment to streams, and help maintain appropriate dissolved oxygen concentrations.
	pH	Any work with green concrete will be isolated from streams and wetlands. Consequently, no impacts to pH are expected.
	Nutrients, Toxicity and Turbidity	Short-term increases in turbidity and nutrients will result from routine road maintenance activities such as erosion repair, culvert and inlet cleaning, and other earth-moving activities. However, the RRMP addresses erosion control and the implementation of the BMPs is designed to reduce the amount of turbidity associated with routine road maintenance activities. Accidental spills of fuel from maintenance equipment may have lethal or sub-lethal impacts on fish, and BMPs address limiting exposure to spills.
Habitat Access	Physical Barriers	Implementation will result in improved fish passage because of attention to passage criteria during routine culvert cleaning, and because of implementation of the fish passage program to repair or replace culverts that impede passage.
Flow Hydrology	Peak Flow Variation and Duration	The City of Portland does not expect to increase the area of impervious surface associated with this program, and consequently affects to peak flow would be minimal. Better ditching practices including removal of sediment buildup and improved design may result in increased infiltration of stormwater, which would minimize impacts to peak flow events.
	Base Flow Conditions	Minor beneficial effects may result from increased infiltration associated with better ditching practices.
	Drainage Network	No new development or added capacity will result from implementation of this program, so no increase to the drainage network is anticipated.
Habitat Elements	Substrate	No long term impacts to substrate are expected.

PATHWAY	INDICATOR	EFFECT ON IMPLEMENTATION OF THE CITY OF PORTLAND RRMP ON THE ENVIRONMENTAL BASELINE
	Large Wood	Some large wood may be removed from river channels to clear culverts or remove debris from bridge piers. The City will attempt to leave the wood in the river system when possible. For example, they will dislodge the wood from the bridge pier and place it downstream from the bridge, if doing so will not impact another bridge structure or culvert. Removal of trees along the right-of-way can reduce large wood recruitment. Mature trees that are removed will be replaced at a 2:1 ratio within the same watershed, and vegetated buffer strips will be left along all stream.
	Off-Channel Habitat	The formation of off-channel habitat beside bridges and culverts or in close proximity to a road can compromise the integrity of these structures, and therefore would be filled. This is expected to be localized and rare.
	Refugia	No effects to habitat refugia are expected.
	Pool Frequency, Depth and Quality	Pools may be affected when they are proximal to bridge piers, and the pool compromises the safety of the bridge. The City would typically add riprap to the pool. This is expected to be extremely localized.
Riparian Condition	Riparian Structure	Trees can be removed to provide access to a bridge or culvert, or if they pose a danger to the traveling public. All mature trees removed will be replaced with native trees within the same watershed. Vegetated buffer strips will be maintained along all streams; the width of the buffer will vary depending on the size of the stream.
	Stream Crossings/km	No new stream crossings are included in the RRMP.
Channel Condition and Dynamics	Streambank Condition	Erosion repairs along streambanks occur when the road and the stream are in close proximity, and erosion along the streambank threatens the integrity of the road. Erosion repairs usually involve riprap, and result in the loss of natural streambank function. To minimize negative effects, repairs will include bioengineering and fish friendly designs, where practical for stability and safety.
	Channel Morphology	In some situations, roadways constrain channel morphology. The RRMP will not alter the existing condition, and in some cases may further constrain channel changes when the channel moves toward a road or structure.
	Floodplain Connectivity	City roads typically parallel streams, and are within the floodplain of these channels. This disrupts normal floodplain function. However, the RRMP does not include the construction of new roads, so the existing condition will be maintained.
	Wetland Storage and Alterations	Wetlands that function as roadside ditches will be disturbed during ditch cleaning activities. However, proper design of ditches minimizes the need for frequent cleaning, and allows for the growth of native vegetation.

Earth-disturbing and cleaning activities near streams can disturb fish and cause them to abandon suitable habitat. These activities can result in noise levels above ambient conditions or increase light at night. Detour routes may result in concentrated traffic volumes and increased access to aquatic habitat that may affect salmon downstream. The use of gas and diesel powered equipment creates a potential for accidental spills of substances toxic to fish. Removal of riparian vegetation associated with grading at storm outfalls and during the removal of debris can affect prey resources, reduce cover habitat, reduce large wood recruitment, increase sedimentation, and increase water temperature.

On balance, the RRMP addresses these issues through activity-specific and general BMPs (see section 2.1.6, below).

2.1.5.2 Channelization or Ditching

Regular channelization or ditching maintenance in or beside watercourses and streams is required to remove built-up sediments, debris or blockages, and to maintain capacity. Channelization and ditching can result in the alteration or loss of salmon habitat through the removal of snags and trees that could function as future large wood. These activities may also degrade hydrogeomorphology, wetlands, riparian vegetation, erosion/deposition balance, soils and water quality, and may affect the creation of critical off- channel habitat. Instream gravel bars can move due to changes in hydrodynamics, resulting in fewer meanders and reduced quantities of gravel for spawning habitat. Juvenile fish that may be rearing in the vicinity would most likely be displaced during maintenance work. The effects to salmonids of increased sediment disturbance, riparian vegetation modification, spills of toxic substances from gas- and diesel-powered equipment, and increased noise are expected to be similar to those described in the earthworks section, above.

2.1.5.3 Removal of Large Wood

Large wood that has accumulated in channels or riparian areas will be removed only when and where there is a safety hazard, such as debris build-up against bridge abutments. Removal activities can cause an increase in turbidity, sediment, gravel, rocks, nutrients, bacteria, heavy metals, petroleum hydrocarbons, synthetic organics and other solids. Excess sediment loading and high turbidity levels can impact redds by smothering eggs with fine sediments, reducing water circulation, and decreasing oxygen availability. Removal of large wood can affect all life history stages of salmonids as a result of excess sediment loading and high turbidity levels. Fish could be impacted by sub-lethal conditions, including the disruption of feeding, attenuated growth patterns of juveniles, or delaying the upstream migration of adults. The large wood removal may also change a stream's hydrology, with effects similar to those identified in the preceding sections, and result in a loss of cover and microhabitat availability for fish.

2.1.5.4 Work Area Isolation, Temporary Water Diversions and Fish Exclusion

Road maintenance activities frequently require work within streams that contain salmonids. Some of these activities require a site to be temporarily dewatered. Although work area isolation techniques can temporarily prevent usage of the work area by listed salmonids, these techniques also decrease or avoid the exposure of listed fish to the effects of construction activities in the work area. In fact, in such cases, work area isolation and fish removal will be necessary. Road maintenance activities that may require fish exclusion actions include work on open drainage systems, watercourses and streams (*e.g.*, sediment removal), culvert repairs, bridges, and emergency slide/washout repairs.

Work area isolation is a conservation measure intended to reduce the exposure of listed fish adverse effects of erosion and runoff on aquatic life. However, diversions, isolation, and exclusion can significantly impact listed fish in the area. Water diversion and temporary structure work creates a physical barrier to migrating salmon. Maintenance work on diversion structures could result in increases in sediment disturbance, riparian vegetation modification, spills of toxic substances from gas- and diesel-powered equipment, and increased noise are similar to those described in the earthworks section, above, resulting in similar effects to salmonids as identified in the preceding sections. Additionally, improper placement of equipment in or around riparian habitat may erode streambanks.

Electrofishing is one means of fish capture. It is employed when other methods prove ineffective and may not be recommended in all situations. Its use will be determined through permit requirements and/or site conditions. This protocol is based on NOAA Fisheries' Guidelines for Electrofishing Waters Containing Salmonids Under the Endangered Species Act (NMFS 2000b). Although the practice is potentially hard on fish, electrofishing is intended to locate residual fish in the isolated work area to further reduce the potential for, or extent of, incidental take.

Electrofishing is a process by which an electrical current is passed through water containing fish in order to stun them—thus making them easy to capture. It can cause a suite of effects ranging from simple harassment to actually killing the fish. The amount of unintentional mortality attributable to electrofishing may vary widely depending on the equipment used, the settings on the equipment, and the expertise of the technician. Electrofishing can have severe effects on adult salmonids and can include the direct and indirect effects of exposure to an electric field, capture by netting, holding captured fish in aerated tanks, and the effects of handling associated with transferring the fish back to the river. Physical injuries from electrofishing include internal hemorrhaging, spinal misalignment, or fractured vertebrae.

The primary contributing factors to stress and death from fish exclusion activities are excessive doses of anesthetic, improper electrofishing techniques, differences in water temperatures (between the river and wherever the fish are held), dissolved oxygen conditions, the amount of time that fish are held out of the water, and physical trauma. It is also common that reintroduction of the stream to a newly-constructed project will temporarily increase turbidity downstream.

2.1.5.5 Vegetation Management

The City of Portland's Vegetation Management Program employs a number of techniques to accomplish their vegetation management goals including mechanical, cultural, and chemical treatments. The purposes of vegetation management are to provide a safe road system, free of sight-hindering brush and limbs, maintain adequate drainage in ditches, and control of noxious weeds. Careful evaluation of effects to watersheds and the environment is part of the decision matrix for choosing an appropriate technique. Activities include suppressing non-desirable vegetation and enhancing desirable vegetation. Short- and long-term vegetation modifications may occur during routine maintenance of open and closed drainage systems, watercourses and streams, stream crossings, bridges, emergency washout repairs, and removal of danger trees along roadways. The removal of vegetation beside watercourses or streams may impact water quality and various habitat elements. Vegetation removal may contribute to a decrease in stream sinuosity and complexity, resulting in the degradation of hydrogeomorphology. It can also decrease refuge and rearing habitat for macroinvertebrates, and increase the water temperature in the immediate area.

2.1.5.6 Pesticide, Herbicide and Fertilizer Applications

The City of Portland's RRMP allows for the application of chemicals (herbicides), and describes the manner and location in which applications may occur. BMPs are included in the RRMP to ensure that the choice to use herbicides as part of the vegetation management program is done appropriately. NOAA Fisheries does not believe that there is currently sufficient information available to ensure that such chemical applications are not creating sublethal affects to listed species. NOAA Fisheries is currently working with Federal agencies on an appropriate monitoring regimen to investigate the fate and transport of chemicals applied during a variety of activities. The monitoring intensity is beyond the scope of the RRMP. Because pesticide (including herbicides) and fertilizer use and monitoring is beyond the scope of the proposed action, the effects of any such use by the City of Portland are not analyzed here. The limitation of the extension of the prohibition on take in this Limit 10(i) RRMP does not extend to the use of pesticides or fertilizers at this time (50 CFR Part 223.203(b)(10)(v).

2.1.5.7 Addition of Impervious Surfaces

Generally, significant increases in impervious surface area within the right-of-way do not fall under the definition of maintenance. Projects that increase impervious surface area are usually part of roadway Capital Improvement Plans (CIPs), and typically are federally-funded or permitted. Roadway CIPs are not addressed by the RRMP and are not covered by this consultation. The Federal nexus requires a separate ESA section 7 consultation. Under some circumstances, however, maintenance activities add impervious surface for safety reasons, rather than to add capacity. New impervious surfaces associated with maintenance work can result in increased levels of heavy metals, hydrocarbons, and other pollutants. Impervious surfaces can also increase water temperature by reducing shaded conditions, and by increasing solar exposure to surface water that would otherwise infiltrate or remain shaded beneath vegetation. New impervious surfaces near streams can cause impacts to riparian vegetation, resulting in reduced cover for fish, a reduction in prey species, increased water temperature, and water quality degradation. RRMP actions that increase flows, such as increases in impervious surfaces, can disturb gravel in salmon or steelhead redds and can also agitate or dislodge developing young and cause their damage or loss. Similarly, actions that reduce subsurface or surface flows, reduce shade, deposit silt in streams, or otherwise reduce the velocity, temperature, or oxygen concentration of surface water as it cycles through a redd can adversely affect the survival, timing, and size of emerging fry.

Increases in impervious surface within the RRMP would be associated with small increases in shoulder width at a few locations. Most shoulder work is only replacement of the existing shoulders with no new width added. The RRMP addresses the need to minimize the loss of vegetation as well as the addition of rock or pavement along road shoulders.

2.1.6 Integrated Minimization Measures

The City of Portland's RRMP incorporates best management practices (BMPs) into their routine maintenance activities with the goal of avoiding and minimizing effects on salmonids and their habitat. Conservation outcomes of the RRMP fall into the following general categories: Sediment collection, worksite pollutant containment, blockage removal, restoration of flow velocities and volumes, removal of fish passage barriers, revegetation, and infiltration.

<u>Sediment Collection</u>
Containment of sediment/pollutants maintains or restores the sediment collection process by removing sediments from many collection points in the drainage system (*e.g.*, catch basins, maintenance holes, retention/detention facilities, pipes, inlets, and vaults). Proper maintenance of the roadway also protects against collapse or failure of the structure, which could result in significant sediment releases to aquatic habitat. The City of Portland has a detailed erosion control program that describes the options for sediment control based on the type of activity and its location in the landscape.

<u>Worksite Pollutant Containment</u>
Many RRMP BMPs involve containment of sediment and other pollutants at the worksite. Similar to collection and removal of sediments and other pollutants from the roadway, containing loose soils, sediment, and other pollutants on the worksite reduces the amount of pollutants that can reach aquatic habitat. A critical component of worksite pollutant containment in the RRMP is an effectiveness monitoring BMP.

<u>Blockage Removal</u>
The timely removal of drainage system blockages reduces the potential for sediment, turbidity, offsite erosion and debris to adversely affect fish habitat. Blockage removal also reduces the

likelihood of system failure, which can have significant adverse habitat effects. BMPs used during this type of work achieve the same objectives as those identified in Sediment Collection and Worksite Pollutant Containment above.

Restoration of Flow Velocities and Volumes

Maintaining or restoring flow velocities and volumes required for health of aquatic habitat is an important conservation outcome that is spelled out in a number of maintenance categories involving drainage system maintenance. The RRMP requires appropriate system design for system repair or replacement, appropriate maintenance of existing systems, and removal of sediment or blockages.

Removal of Fish Passage Barriers

When performing stream crossing maintenance activities, the RRMP prescribes the removal of fish passage barriers. The City of Portland RRMP also calls for replacing or retrofitting priority culverts to improve fish passage when a CIP project is planned for that crossing. All fish passage work requires adherence to all Federal, state and local permit and regulatory requirements.

Revegetation

The RRMP specifies the need for revegetation of disturbed areas to reduce erosion and sediment transport. Revegetation provides biofiltration, shading, and bank stabilization in riparian areas. It also promotes macroinvertebrate population growth, lowers herbicide use, and suppresses non-desirable vegetation. The City of Portland RRMP requires replanting with vegetation that is best suited for the site, with a preference for local genotype native plants.

Infiltration

The RRMP specified the maximization of opportunities for increased infiltration and biofiltration. Cleaning and maintaining roadway shoulders and grass-line ditches improves infiltration.

Training

The RRMP training program will provide crew members and supervisors appropriate training in when to use BMPs and recognizing problems with BMPs. Key elements of the training are:

1. New employee orientation.
2. Monthly Pollution Prevention Manager meetings.
3. Bi-monthly Pollution Prevention Field Crew meetings.
4. Erosion and sediment control training.
5. Spill clean-up kit training.
6. Participation in professional symposiums/conferences.
7. Water quality awareness training.
8. Endangered Species Act Awareness Training.
9. National Pollutant Discharge Elimination System (NPDES) requirements.
10. ODOT Manual best management practices.

Training will be recorded in a database, and formal training sessions will be performed by supervisory staff and consultants to ensure that staff understand the intent and the language of the BMPs. Engineering staff will be responsible for instructing contractors on the appropriate use of BMPs. Appropriate staff will attend training around the state to increase their knowledge of fish passage, erosion control, hazardous materials spill response and handling, and the NPDES requirements. As new information or tools are developed, they will be integrated into the training program, and covered at regularly scheduled meetings.

Monitoring and Reports

PDOT currently prepares and submits an annual Operations and Maintenance report as part of the City's NPDES permit. This annual report summarizes the activities of the prior year including training and new best management practices. The City will add monitoring and reporting requirements to this report. The report will document:

1. Investigations of complaints received from/by City staff, other agencies, or members of the public on effects to the environment from routine road maintenance activities.
2. Modifications of, or improvements to, any minimization/avoidance actions including summaries of challenges or successes in applications.
3. Compliance reviews of any construction projects undertaken by the Bureau of Maintenance.
4. Overall summary of contacts and coordination with NOAA Fisheries on specific issues.

As an additional level of assurance, Limit 10 of the 4(d) rule (July 10, 2000, 65 FR 42422) authorizes NOAA Fisheries to periodically evaluate a qualified road maintenance program for its effectiveness in maintaining and achieving habitat function that provides for conservation of the listed salmonids. Whenever warranted, NOAA Fisheries will identify to the City of Portland ways in which the program needs to be altered or strengthened. Changes may be identified if the program is not protecting desired habitat functions, or where even with the habitat characteristics and functions originally targeted, habitat is not supporting population productivity levels needed to conserve the listed species. If the City of Portland does not make changes to respond adequately to the new information in the shortest amount of time feasible, but not longer than one year, NOAA Fisheries will publish notification in the Federal Register announcing its intention to withdraw the limit so that take prohibitions would then apply to the program as to all other activities not within a limit.

2.1.7 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." This is step 4 in NOAA Fisheries' analysis process. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

A number of reasonably foreseeable non-federal resource management strategies will affect listed ESUs and their habitat within the action area. Tribal, state, and local government actions are likely to be in the form of legislation, administrative rules, or policy initiatives. These actions may include changes to land use patterns and water use allocations, which can affect the intensity and location of these across the action area. Examples include water quality and pollution control, streamflow enhancement, watershed planning, environmental land use planning and zoning, and habitat conservation plans (NOAA Fisheries 2003a). A general description of the primary tribal, state and local programs is summarized in Chapter 5 of the Environmental Assessment for the RRMP (NOAA Fisheries 2003b).

Activities affecting listed salmonids activities within the action area are expected to increase with a projected increase in population. Thus, NOAA Fisheries assumes that future private and state actions will continue within the action area, but at increasingly higher levels as population density climbs, thus affects to listed species are expected to increase.

2.1.8 Conclusion

The final step in NOAA Fisheries' approach to determine jeopardy is to determine whether the proposed action is likely to appreciably reduce the likelihood of species survival or recovery in the wild, or destroy or adversely modify designated critical habitat. NOAA Fisheries has determined that when the effects of the approval of the City of Portland's RRMP addressed in this Opinion are added to the environmental baseline and cumulative effects occurring in the action area, it is not likely to jeopardize the continued existence of listed salmonids, or destroy or adversely modify designated critical habitat.

These conclusions are based on the following considerations: (1) NOAA Fisheries will have continuing oversight authority of the RRMP as provided in the 4(d) Rule; (2) short-term effects of road maintenance will be minimized or avoided through the use of best management practices that are modified through time, as needed; (3) over the long term, benefits to habitat (particularly water quality) may result from implementation of best management practices; (4) best management practices will likely improve through regular internal discussions at the City of Portland which will result in better practices on the ground over the long term; (5) NOAA Fisheries will review the RRMP annual reports, and conduct a substantial review of the program after five years; and (7) the proposed approval is not likely to result in the impairment of properly functioning habitat, or retard the long-term progress of impaired habitat toward proper functioning condition essential to the long-term survival and recovery at the population or ESU scale.

These effects are reasonably certain to result in incidental take, but the extent of harm is likely to be minimized by specific measures included in the RRMP. Additionally, the RRMP's BMPs and NOAA Fisheries' oversight role shall provide for constant improvements to routine road maintenance practices in the City of Portland.

2.1.9 Reinitiation of Consultation

This concludes formal consultation on NOAA Fisheries' proposed qualification of the RRMP. As provided in 50 CFR section 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (3) a new species is listed or critical habitat designated that may be affected by the action.

Additional reinitiation requirements, including re-evaluation and modification requirements, are set forth in the RRMP and in Limit 10 of the 4(d) Rule (July 2000), which are incorporated herein.

2.2 Incidental Take Statement

Where NOAA Fisheries approves a 4(d) Limit, there is no take liability for threatened species, and so there is no need of a take exemption through ESA section 7(o).

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2)).

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (§305(b)(4)(A)).

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other waterbodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Casillas *et al.* (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions.

3.3 Proposed Actions

The proposed action and action area are detailed above in section 2.1 and 1.2 of this document. Routine road maintenance activities conducted in accordance with the RRMP are covered by this MSA consultation. The action area is defined as the streambed, streambank and riparian corridor of the Willamette River and Columbia River and all their tributaries within the City of Portland that are within the geographic boundaries of the Chinook and coho salmon ESUs and starry flounder. This area has been designated as EFH for various life stages of Chinook salmon, coho salmon, and starry flounder.

3.4 Effects of Proposed Action

As described in detail in section 2.1.5 of this Opinion, the proposed action may result in short-term adverse effects to a variety of habitat parameters. The RRMP identifies anticipated impacts to affected species likely to result from the proposed activities and the measures that are necessary and appropriate to minimize those impacts. These effects include delivery of sediments to streams through routine road maintenance activities, vegetation removal, loss of large wood, and hydraulic modifications.

3.5 Conclusion

NOAA Fisheries concludes that the proposed action may adversely affect the EFH for the Pacific salmon species and starry flounder.

3.6 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. NOAA Fisheries understands that the conservation measures described in the RRMP will be implemented by the City of Portland approved under Limit No. 10(i). Furthermore, it believes that these measures are sufficient to address the adverse impacts to EFH described above.

3.7 Statutory Response Requirement

Pursuant to the MSA (section 305(b)(4)(B)) and 50 CFR 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

NOAA Fisheries must reinitiate EFH consultation with itself if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR. 600.920(l)).

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